Doubt and organic file jan 3

Tuesday, January 3, 2023 3:41 PM

Q. $MnO_4^- + C_2O_4^{2-} \longrightarrow Mn^{+2} + CO_2$ ($C^{+3} \to C^{+4}$; $n_f = 5$, $n_f = 2$)

$16H^+ + 2MnO_4^- + 5C_2O_4^{2-} \longrightarrow 2Mn^{+2} + 10CO_2 + 8H_2O$

Eqm

(35) Pg-180 (WA)

	Conical $1C_6H_5COOH$	Burette $+1NaOH$	$\longrightarrow 1C_6H_5COONa$	$+H_2O$
	a	a/2		
	a/2	0	a/2	

$[C_6H_5COO^-] = a/2$

$[C_6H_5COOH] = a/2$

WA + its salt with SB ⇒ Acidic Buffer

$pH = pKa + \log \frac{[\text{Salt Anion}]}{[WA]}$

$4.2 = pH = pKa$

$4.2 = -\log Ka$

$-4.2 = \log Ka$

$Ka = \text{antilog}(-4-0.2)$

$= \text{antilog}(-5+0.8)$

$= 6.31 \times 10^{-5}$

\# $\overset{5}{CH_3}-\overset{4}{CH}(CH=O)-\overset{3}{CH_2}-\overset{2}{CH}(CH_3)-\overset{1}{COOH}$ (COOH: 2°S; CH=O: 2°P)

Note: If low priority chain terminating f.grp (2°P) if present, will not be counted in main chain. [Grps like −CN, −COCl, −COOR, −CONH$_2$, −CHO etc.

eg.

$\overset{3}{CH_3}-\overset{2}{CH}(CONH_2)-\overset{1}{COOH}$ — 2-Carbamoyl propanoic Acid

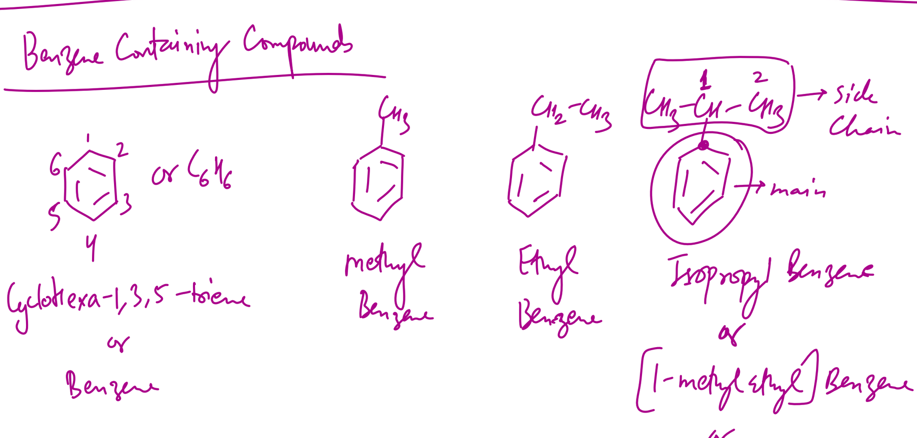
$NC-\overset{3}{CH_2}-\overset{2}{CH_2}-\overset{1}{COOH}$ — 3-Cyanopropanoic Acid

$\overset{5}{CH_3}-\overset{4}{CH_2}-\overset{3}{CH}(CHO)-\overset{2}{CH_2}-\overset{1}{COOH}$ — 3-Formyl pentanoic Acid

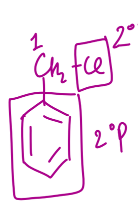
$\overset{5}{CH_3}-\overset{4}{CH_2}-\overset{3}{CH_2}-\overset{2}{CH}(CHO)-\overset{1}{CN}$ — 2-Formyl pentane-nitrile

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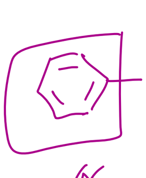
Benzene Containing Compounds



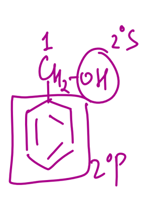
Cyclohexa-1,3,5-triene or Benzene; methyl Benzene; Ethyl Benzene; Isopropyl Benzene or [1-methyl ethyl] Benzene or Cumene



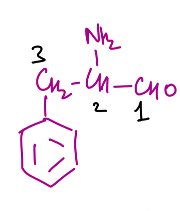
1-Chloro-1-phenyl methane



or C_6H_5- Phenyl



Phenyl methanol



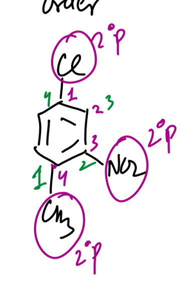
2-Amino-3-phenyl propanal

only substituents → Numbering is done such a way that

(a) Lowest set of Locants is achieved (1,2,6 / 1,2,4 ✓)

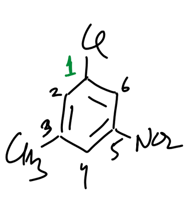
(b) If set is same, then follow alphabetic order

eg.



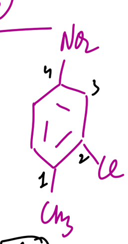
1,3,4

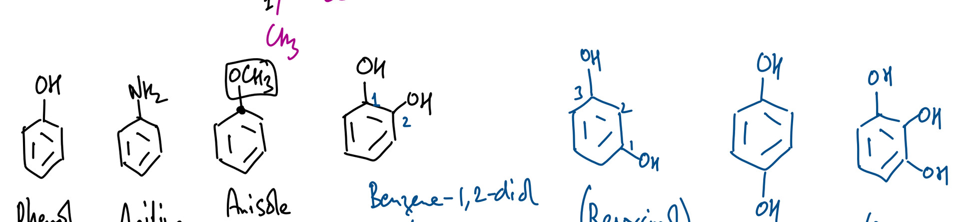
1,2,4 ✓



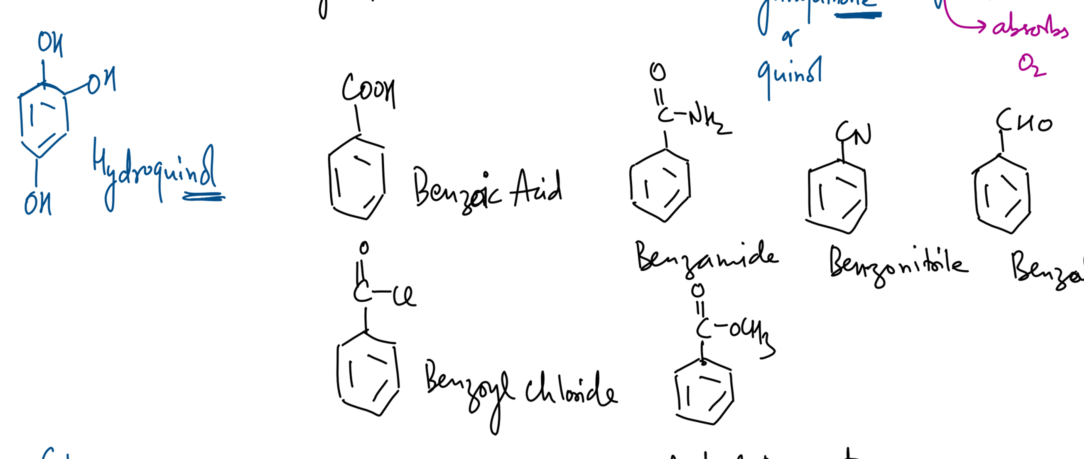
1-Chloro-3-methyl-5-Nitro Benzene

Solve Q-85 (Pg-95)

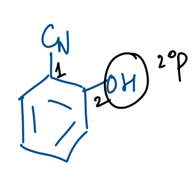




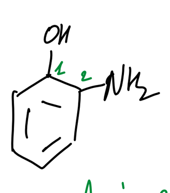
Phenol, Aniline, Anisole or methoxy Benzene, Benzene-1,2-diol (Catechol), (Resorcinol), Hydroquinone or quinol, (Pyrogallol) → absorbs O_2



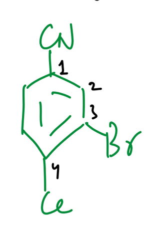
Hydroquinol, Benzoic Acid, Benzamide, Benzonitrile, Benzaldehyde, Benzoyl chloride, Methyl Benzoate



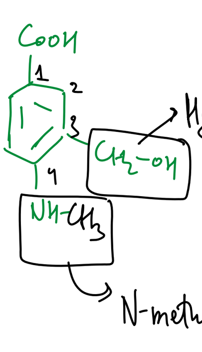
2-Hydroxy Benzonitrile



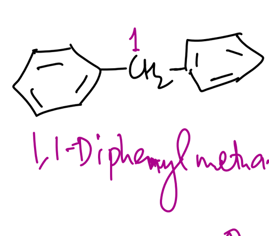
2-Aminophenol



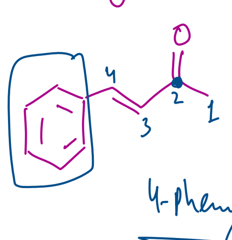
3-Bromo-4-chloro Benzonitrile



3-(Hydroxymethyl)-4-(N-methylamino) Benzoic Acid

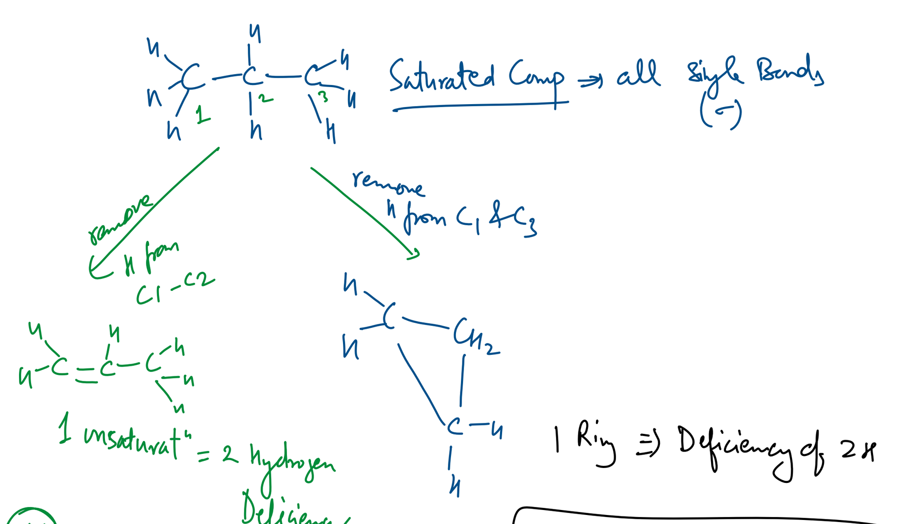


1,1-Diphenyl methane



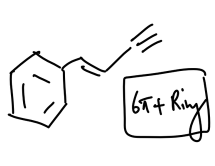
4-phenyl But-3-en-2-one

Degree of Unsaturation (DU) or Index of hydrogen Deficiency (IHD) or Double Bond Equivalent (DBE)

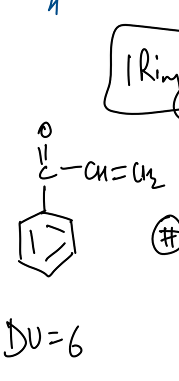


|π Bond ⇒ 1 DU|

|1 Ring or Cyclization ⇒ 1 DU|



6π + Ring; DU=7



DU=6



(Pyridine) DU=4

\# from Molecular formula

$DU = \frac{2C + 2 - H}{2}$ (C → no. of C; H → no. of H)

⇒ Oxy & Sulphur ⇒ No effect

1N or 1P ⇒ −1 H

1 halogen ⇒ +1 H

eg $C_5H_5N \to C_5H_{5}H_{-1} \Rightarrow C_5H_4$

$DU = \frac{2C+2-H}{2} = \frac{(2\times5)+2-4}{2} = 4$

\# C_3H_6O DU=1

\# $C_{10}H_{20}Cl_2$ or $C_{10}H_{22}$ DU=0

\# C_6H_5NO or $C_6H_5H_{-1} \Rightarrow C_6H_4$ DU=5

\# C_3H_7Cl DU=0

\# C_4H_6 DU=2

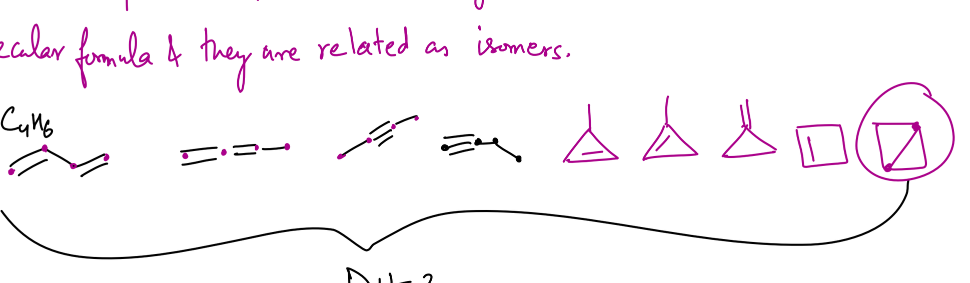
\# Alkene C_nH_{2n} DU=1

\# Alkane C_nH_{2n+2} DU=0

\# Alkyne C_nH_{2n-2} DU=2

\# If no. of C & DU is same for 2 compounds, then they have same molecular formula & they are related as isomers.

eg C_4H_6



DU=2

C=4

all have same m.f & they are structural isomers of each other

C=C−C=C Conjugated dienes

C=C=C Cummulated or Consecutive dienes

\# DU=0, Structures have no π-Bond & Ring

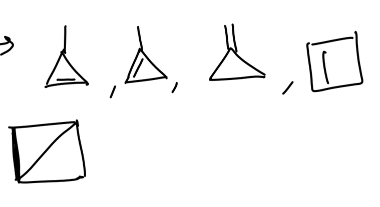
or

Acyclic Compounds with all Single Bonds

\# DU=1 → = ; → Ring

\# DU=2 → 2π (=+=, ≡); → π + Ring; → 2 Ring

C_4H_6: C=C−C=C, C=C=C−C; C−C≡C−C, C≡C−C−C

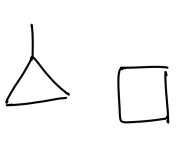


Draw all structures of

Q 1) C_4H_8

DU=1 → = : C=C−C−C C−C=C−C $H_2C=C(CH_3)-CH_3$

→ Ring



(5) ✓

2) C_6H_{14} DU=0

C−C−C−C−C−C

C−C−C−C(C)−C C−C−C(C)−C−C

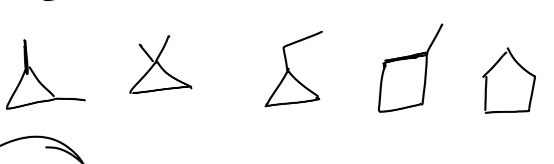
C−C(C)−C(C)−C C−C(C)(C)−C−C

3) C_5H_{10}

DU=1

C=C−C−C−C C−C=C−C−C

C=C(C)−C−C C=C−C(C)−C C−C(C)=C−C



Total 10

Isomerism

↳ Relationship B/w 2 compounds having

1. Same DU, Same m.f
2. Different arrangement of atoms or Bonds
3. Different physical or chemical properties or Both.

chemical → Rxn

physical → Solubility, m.p, B.p, density, Dipole moment, Stability etc.

Types of Isomerism

- Structural isomerism or Constitutional Isomerism → different Bond Connectivity leading to change in any of these ⇒ 2°P, 1°P, W.R, 1°S, 2°S
- Stereoisomerism or Configurational Iso.
  - Same Bond Connectivity → Same 2°P, 1°P, WR, 1°S, 2°S
  - only arrangement is different.

eg

